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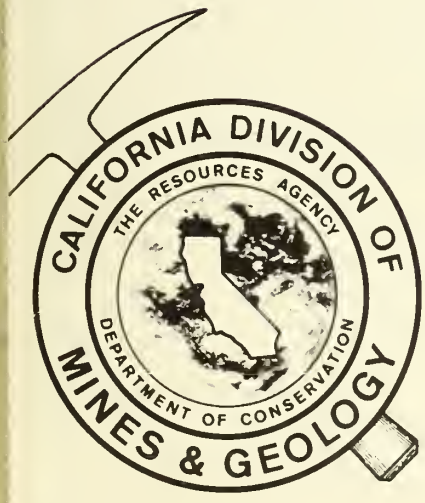

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SIXTY—EIGHTH REPORT OF THE STATE GEOLOGIST

ACTIVITIES OF THE CALIFORNIA DIVISION OF MINES AND GEOLOGY JULY 1, 1974, THROUGH JUNE 30, 1975

James E. Slosson, State Geologist
California Division of Mines and Geology
1416 9th Street, Room 1341
Sacramento, CA 95814

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION

THE RESOURCES AGENCY
DIVISION OF MINES AND GEOLOGY

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STATE OF CALIFORNIA—THE RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
DIVISION HEADQUARTERS
RESOURCES BUILDING, ROOM 1341
1416 NINTH STREET
SACRAMENTO, CA 95814

District Offices: LOS ANGELES
Junipero Serra Bldg., Rm. 1065
107 South Broadway
90012

SACRAMENTO
Resources Bldg., Rm. 118
1416 Ninth Street
95814

SAN FRANCISCO
Ferry Building
94111

Honorable Lewis A. Moran
Acting Director
Department of Conservation
Sacramento, California

Dear Director Moran:

This statutory report summarizes the accomplishments of the California Division of Mines and Geology for fiscal year 1974-75.

The Division continued its productive efforts in the recognition and recordation of geologic and seismic hazards and development of mitigating measures related to these hazards. One of the Division's objectives has been to assist local government in this effort. Twelve major reports (1 Bulletin, 8 Special Reports, 2 Map Sheets, 1 Preliminary Report) as well as 3 guideline notes and 14 major articles in California Geology were prepared and released for use during fiscal year 1974-75, to provide general geologic and seismic data to local government and specifically to aid them in the preparation of their General Plans. Eight other technical publications were released during the year.

Bulletin 196, a major Division report sponsored in part by the U.S. Department of Housing and Urban Development, contains major contributions by Division geologists. Division studies for the bulletin were completed as a part of the Los Angeles County - Division cooperative program, and data and conclusions in the bulletin were used in the Los Angeles County Seismic Safety element.

The Division's reports will also be of assistance to State and Federal governmental units as well as to the public throughout the State. It has become apparent that local government and the public are more and more looking to the Division of Mines and Geology for expertise, guidance and assistance. The dedication of the Division's staff to scientific achievement and advancement has been the prime mover in the success of this effort.

Local governments have completed, or have well advanced General Plans which contain pertinent sections or elements related to geology and seismology, such as the Seismic Safety element, the geologic hazards portion of the Public Safety element, and the Resources element. Some counties, such as Sonoma, Marin, Santa Clara, Ventura, Los Angeles, Orange, and San Bernardino, augmented their own efforts related to the preparation of the General Plan elements by contracting for cooperative studies with the Division. A few counties, such as San Mateo, Riverside, Alameda, and Contra Costa, improved their capabilities with respect to the recognition and mitigation of geologic and seismic hazards by adding geologists to their staffs; others, such as Santa Clara and San Bernardino, have contractual agreements with private professional geologists to provide this service. It is hoped that wisdom will prevail and that the remaining counties which lack this expertise will follow suit so that millions of dollars of unnecessary losses from geologic and seismic hazards can be avoided. Bulletin 198, published in 1973, lucidly points out the easy-to-recognize, damaging, geologic and seismic hazards and presents recognized mitigating procedures. Enlightenment on the part of the real estate and construction industries could also be of great assistance in reducing these losses that are ultimately borne by the public. In addition to direct citizen property loss, public property losses are costing local government tens of millions of dollars per year.

The Alquist-Priolo Act special studies zoning has been expanded this fiscal year to include portions of the Antioch, Buena Vista, Fort Sage, Garlock, Imperial (new fault) Kern Front, Manix, Newport-Inglewood, Owens Valley, Rodgers Creek-Healdsburg, San Andreas (Santa Cruz County segment, revised), San Fernando, San Gregorio, and White Wolf faults. Maps showing these faults were released in July 1975 and will become effective as new and additional study zones. Experience with this act has varied within local governments--some are readily doing a commendable job; others, because of lack of expertise and understanding, are falling short of the goal. Assistance by the CDMG staff has improved local operational procedures to implement the act and has provided timely and valuable assistance to local governments.

The 1974-75 Division efforts in geophysics and seismology have been exemplary. During the fiscal year approximately 164 geologic/seismic reports prepared by consultants have been processed for the Hospital Building Safety Act. The quality of these reports is very good, in part due to the efforts of private industry and in part due to the efforts of the Division. The Division staff should be commended for its effort and its desire to increase application of the "state of the art" related to seismic safety and earthquake engineering. The fruits of this effort have carried over to the Division's activities regarding the geologic and seismic elements of critical Environmental Impact Reports and Environmental Impact Statements.

During fiscal year of 1974-75 the Division expanded its mineral resources capabilities. Grants from the United States Bureau of Mines have allowed this timely and needed acceleration and expansion of this phase of the Division's work. In light of the current or energy fuel crisis and the probable future minerals crisis, the State Geologist pleads for additional funding and authority to meet this challenge. Hopefully the State of California will be prepared when the shortage and the crisis come.

In closing, the State Geologist and the staff thank you for your assistance and understanding. It has personally been a pleasure to serve under you and I'm sure the staff wishes to convey the same to you.

Respectfully,

James E. Slosson
State Geologist

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MISSION AND BROAD OBJECTIVES

The occurrences of earth materials and earth processes are fundamental geologic factors that bear upon the economic well-being, safety, and pleasure of man. Geologic factors thus have a bearing upon many significant issues confronting man; nevertheless, such factors often are not considered and frequently are not even recognized in arriving at the solution to those issues.

It is the mission of the Division of Mines and Geology to encourage the understanding and application of geologic knowledge in relevant human enterprises and to assure that, to the extent feasible, geologic information for land use and other decision making is available when needed.

The continuing operational objectives of the Division are to produce, compile, interpret, and disseminate -- usually through publication -- geologic information needed for planning and development.

Limited State funds result in limitations on the degree to which the continuing objectives can be attained in a given period of time. Current objectives therefore are set on a priority basis that is related to an expressed interest in the results of Division effort. Interest is commonly evidenced by the willingness of a State, local, or Federal governmental agency to provide cooperative funding to expedite Division effort, or by a direct mandate of the Legislature.

STATUTORY AUTHORITY

The Division operates under the authorities set forth in Chapter 2 of Division 1 and Chapters 1 and 2 of Division 2 of the Public Resources Code. The significant sections are summarized here:

Sections	Substance of Law
601, 607	Establishes Department of Conservation in The Resources Agency and Division of Mines and Geology and three other Divisions in Department of Conservation.
660-667	Establishes State Mining and Geology Board and its responsibilities.
680	Establishes State Geologist as Chief of Division.
2201	State Geologist shall employ geologists and qualified specialists to do Division's work.
2203	State Geologist shall submit an annual report, including review of measures taken to counter geologic hazards, and review of economic utilization and conservation of State's mineral resources.
2204	State Geologist may receive and manage gifts on behalf of State.

2205 State Geologist may: Study mineral resources, mineral industries, and geology of the state; Collect mineral statistics; Collect geological and mineralogical specimens and models to constitute Division's exhibits; Provide technical library to be Division's library; Maintain, in effect, a bureau of information on the State's mineral industries; Conduct studies of geologic hazards in urban areas, including activities under cooperative agreements; Maintain a laboratory to perform physical and chemical tests and analyses; Issue reports and maps on the geology of the State and the statistics and technology of the State's mineral industries.

2207 State Geologist shall compile and publish statistical bulletins to show totals of minerals produced, annually.

2622 State Geologist shall delineate Special Studies Zones to encompass potentially and recently active faults (Alquist-Priolo Act).

2650 State Geologist shall carry out State Mining and Minerals Policy.

2700 State Geologist shall conduct the Strong-Motion Instrumentation Program throughout the State.

RECENT LEGISLATION

Legislative measures enacted into law during 1974-75 of concern to the Division are as follows:

AB 1422, Chappie Chapter #873 (1974)	Amends Geologist-Geophysicist Act in regard to board composition, qualified geophysical experience and violations.
AB 3173, Chappie Effective 9-26-74 Chapter #1363 (1974)	Extends deadline for preparation of Safety and Seismic Safety General Plan elements until 12-31-76 for smaller counties.
AB 4140, Chappie Chapter #859 (1974)	Requires buildings be designed to resist earthquakes according to Uniform Building Code.
AB 4149, Knox Chapter #1383 (1974)	Authorizes changes in housing code for temporary housing on mining claims on Federal lands.
AJR 77, MacDonald Res. Chapter #110 (1974)	Urges federal legislation and support of strict regulation of surface mining.
SB 5, Alquist Effective 5-4-75 Chapter #61 (1975)	Exempts new single-family wood frame dwellings within Alquist-Priolo Special Studies Zones from report requirements.

SB 58, Alquist Effective 1-1-76 Chapter #47 (1975)	Allows exempted cities and counties to participate in the State Strong Motion Instrumentation Program.
SB 1729, Alquist Chapter #1413 (1974)	Creates State Seismic Safety Commission.
SB 2422, Alquist Chapter #1341 (1974)	Amends Alquist-Priolo Act by redefinition of terms and deletion of State-local fee sharing.
SJR 59, Berryhill Res. Chapter #134 (1974)	Requests convention for constitutional amendment to allow people of U.S. to buy, hold and sell gold.
SJR 60, Berryhill Res. Chapter #135 (1974)	Requests Congress propose constitutional amendment to allow people of U.S. to buy, hold and sell gold.
SJR 63, Alquist Res. Chapter #192 (1974)	Requests Congress to initiate abatement of seismically hazardous Federal structures in California.

All chapters became effective January 1, 1975 unless noted otherwise.

In addition several urgency measures to modify the Field Act requirements (earthquake safety for schools) were passed shortly before the June 30, 1975 compliance deadline.

STATE MINING AND GEOLOGY BOARD

This Board, which is within the Department of Conservation, consists of 11 members, nine of whom are "associated with or having broad knowledge of the mineral industries of this State, of its geologic resources, or of related technical and scientific fields..." and two of whom are members of the public, having an interest in, and knowledge of, the environment.

The Public Resources Code states that: "The Board shall represent the State's interest in the development, utilization, and conservation of the mineral resources of the State and in the development, collection, collation, and dissemination of geological information necessary to the understanding and utilization of the State's terrain and information pertaining to earthquake and other geologic hazards. It may establish policies conforming to the provisions of State statutes to govern the administration of the Division of Mines and Geology." The Board reviews Division policies and programs from time to time at its meetings. The Board also serves as a policy and appeals board for the purposes of the active fault Special Studies Zones, or Alquist-Priolo, Act (Chapter 7.5, Division 2, Public Resources Code).

The State Geologist, who serves as Chief of the Division, is "appointed under provisions of the State Civil Service Act by the Director (of the Department of Conservation) upon nomination by the Board".

During fiscal year 1974-75, the Board met July 18 in Los Angeles, September 19 in Sacramento, October 24 in San Francisco, January 23 in Los Angeles, February 27 in Sacramento, March 20 at Stanford University, April 24 in Long Beach, May 29 at San Francisco Airport, and June 26 in Sacramento.

Board Actions, fiscal year 1974-75

- Approved current (July 1974) edition of the Alquist-Priolo Special Studies Zones Policies and Criteria as modified by the Board, to guide local government building permit decisions.

- Asked the State Geologist to invite Senator Nejedly's staff assistant to discuss mine reclamation bill.

- Appointed a subcommittee to formulate Board recommendations on Senate and Assembly bills which replace Department of Conservation with departments of Land and Energy Resources, and Forestry.

- Adopted a motion to send letter supporting concept of American Institute of Professional Geologists-sponsored bill to release oil well data.

- Elected for one-year terms: Clarence R. Allen, Chairman; Eugene F. Reid, Vice Chairman; Donald A. Woolfe, Secretary.

- Sent a letter to Secretary for Resources Claire T. Dedrick, giving Board's endorsement of the proposed State Geological Survey concept.

- Adopted a motion to endorse the recommendations of the Board's Mining Plan Subcommittee, to be presented as Board policy at the hearing on legislation concerning mined land reclamation.

- Adopted a motion to seek an increase in funds for Division of Mines and Geology publications in accordance with the Board's review of the publication program.

- Adopted a motion to accept the revised policies and criteria implementing the Alquist-Priolo Special Studies Zones Act, as modified to conform to recent legislation.

STATE MINING AND GEOLOGY BOARD

BOARD MEMBERS	CURRENT TERM (eff.1-15-75)	FIRST APPOINTED	SPECIALTY (per Sec.661,PRC)
CLARENCE R. ALLEN Seismological Laboratory California Institute of Technology Pasadena, CA 91125	1973 - 1977	1969	Geophysicist Seismologist Vice-chairman c.y.1974 Chairman, c.y.1975
PHILIP R. BRADLEY 2801 Oak Knoll Terrace Berkeley, CA 94705	1972 - 1976	1944	Mining Engineer
EDMOND F. BROVELLI President, Basalt Rock Company P. O. BOX 2540 Napa, CA 94558	1971 - 1975	1962	Public member Mining interests
L. LeROY CRANDALL LeRoy Crandall & Associates 711 North Alvarado Street Los Angeles, CA 90026	1973 - 1976	1973	Soils engineer
JOSEPH E. HARING Economics Department Occidental College Los Angeles, CA 90041	1971 - 1975	1971	Public member
PAUL C. HENSHAW Homestake Mining Company 650 California Street San Francisco, CA 94108	1972 - 1976	1968	Mining geologist
RICHARD H. JAHNS School of Earth Sciences Stanford University Stanford, CA 94305	1974 - 1978	1966	Geologist Chairman, c.y.1974
J. WILMAR JENSEN Jensen and Gaarde 1514 H Street (P.O.BOX 1726) Modesto, CA 95354	1974 - 1978	1971	Public member
EUGENE F. REID P. O. BOX 2471 Bakersfield, CA 93303	1971 - 1975	1971	Geologist Vice-chairman c.y.1975
KARL V. STEINBRUGGE Manager, Earthquake Department Insurance Service Office 550 California Street San Francisco, CA 94104	1973 - 1977	1969	Structural engineer
DONALD A. WOOLFE Planning Director San Mateo County Planning Department County Government Center Redwood City, CA 94063	1973 - 1977	1973	County government Urban planner Secretary, c.y.1975

ADMINISTRATION AND ORGANIZATION

While no formal changes were made in the approved organization chart of 1 March 1974, there were some internal adjustments made in reporting relationships which caused some deviation from the approved plan. The Advance Planning officer devoted full-time effort to assisting the State Geologist directly with the review and analysis of proposed legislation. The Alquist-Priolo Fault Hazards zoning project was removed from the administrative direction of the District Geologist in San Francisco and placed under the administrative direction of the Deputy for Administration and Planning. In addition, several geologists were reassigned to work under the direction of James R. Evans, Mineral Resource Coordinator and Special Assistant to the Chief. These adjustments were made at the direction of the State Geologist.

The Chief Deputy State Geologist continued to provide work direction to the District Geologists. Late in the fiscal year, Mr. Thomas E. Gay, Jr., Chief Deputy, was appointed as Acting Oil and Gas Supervisor for a limited duration and Mr. Cliffton H. Gray, Jr., District Geologist at Los Angeles, served as Acting Chief Deputy. The District Geologists continued to be responsible for the generation of programs, projects, the timely completion of project work, negotiation of cooperative contracts, and the critical review of all manuscripts originating in their districts. Dr. John T. Alfors, Mr. Cliffton H. Gray, Jr., and Mr. Richard M. Stewart are District Geologists of Sacramento, Los Angeles, and San Francisco, respectively.

The Deputy for Administration and Planning nominally served as the Chief of the Division staff which is formally composed of three functions: Advance Planning, Geodata, and Program and Support. The Advance Planning Officer, as previously mentioned, was used throughout the year on legislative matters. The Geologic Data Officer directed processing of manuscripts for publication, distribution of information to the general public and government agencies, and the publishing of the monthly magazine California Geology. The Program and Support Officer provided administrative assistance to the Division, directed the Publications Supervisor and staff, and supervised the statewide Strong-Motion Instrumentation Program. Early in the fiscal year, the newly created position of Support Assistant, under the direction of the Program and Support Officer, was filled to assist in carrying out administrative tasks.

APPROVED

R. B. Livermore Jr.

SECRETARY FOR RESOURCES

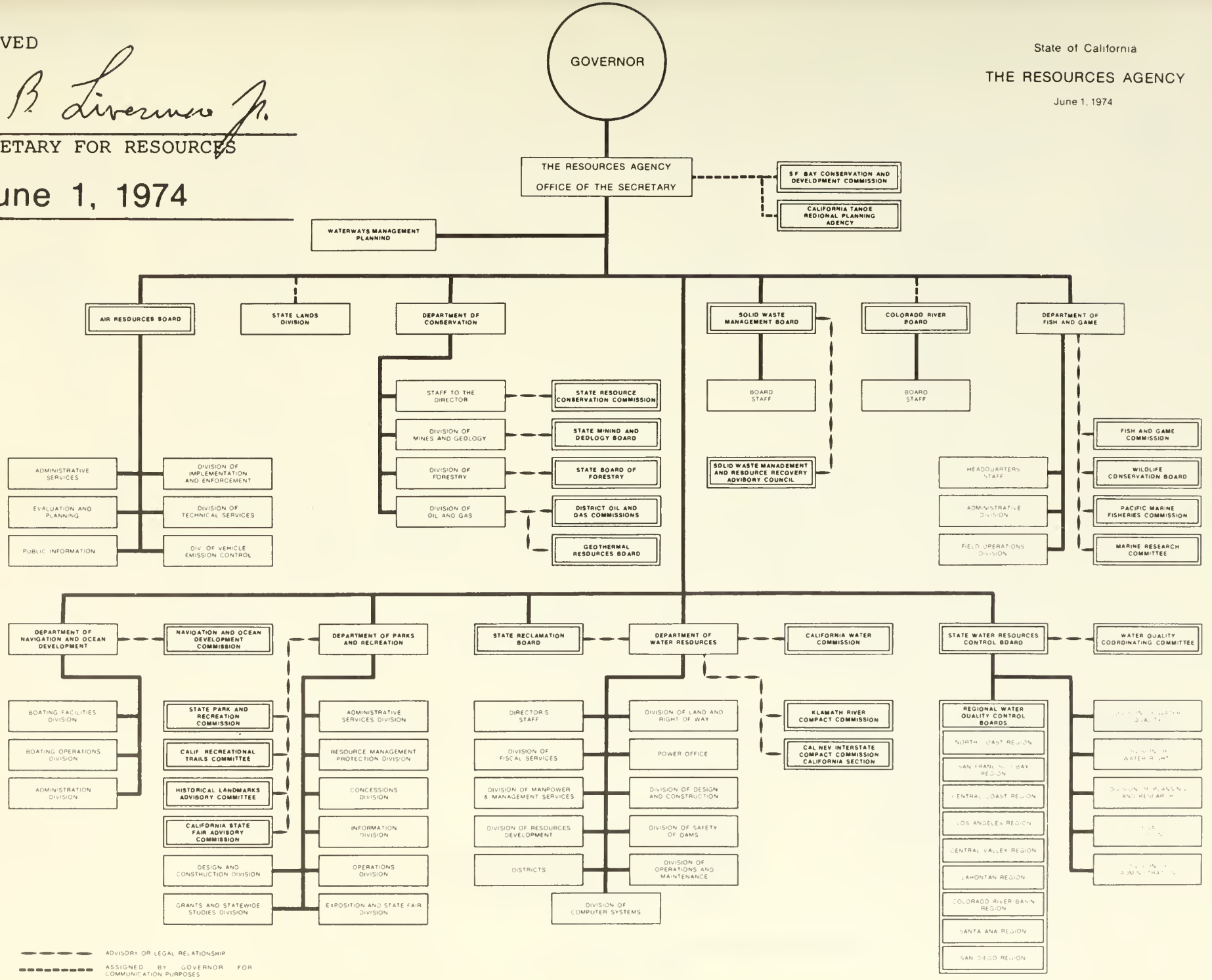
June 1, 1974

DATE

State of California

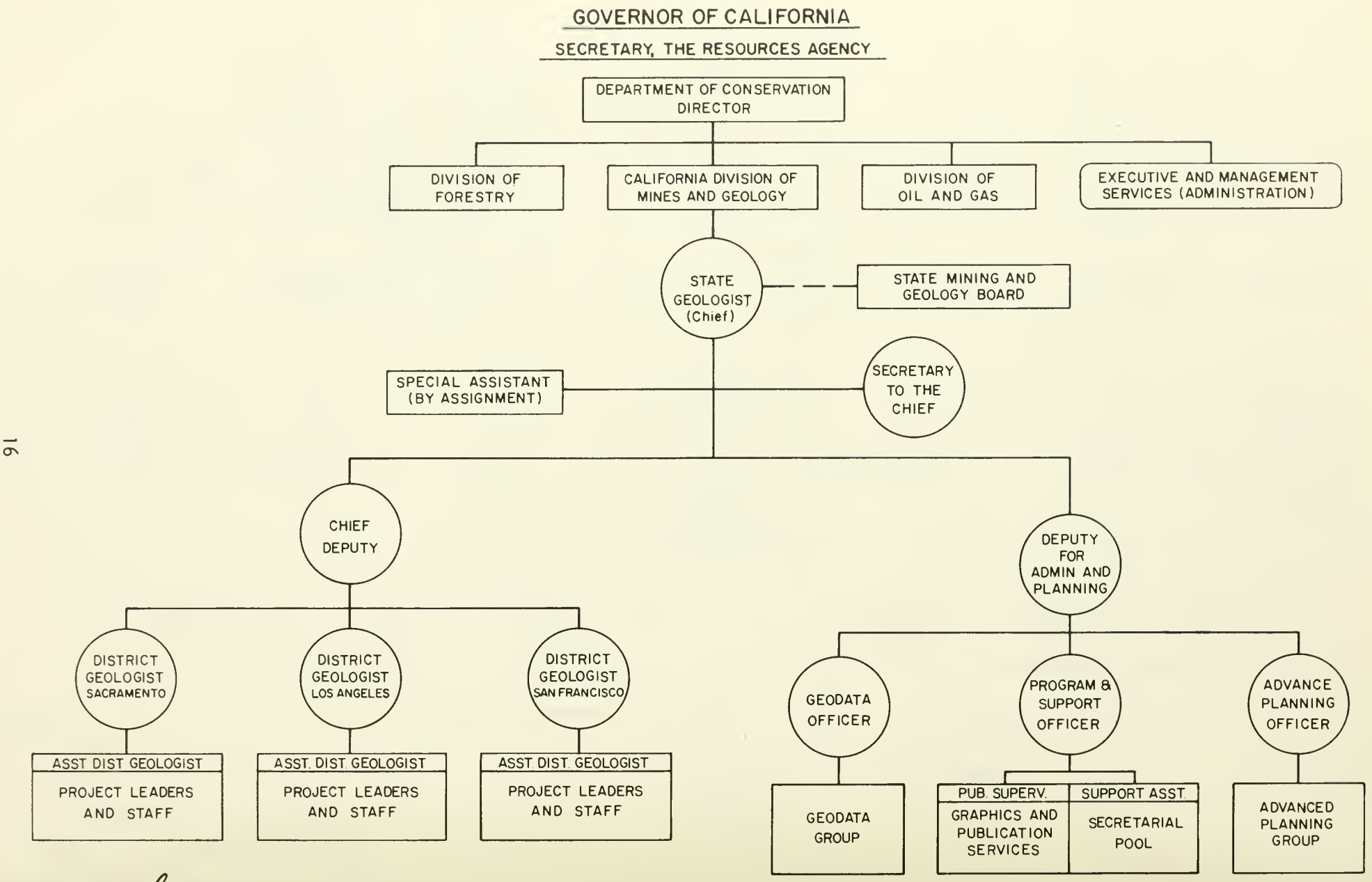
THE RESOURCES AGENCY

June 1, 1974



ORGANIZATION
CALIFORNIA DIVISION OF MINES AND GEOLOGY

MARCH 1, 1974



APPROVED
James E. Slosson
STATE GEOLOGIST
Hays S. Hunter
DIRECTOR

PERSONNEL

James E. Slosson is the State Geologist and Chief of the Division of Mines and Geology. He is assisted by his executive staff--the Chief Deputy State Geologist, the Deputy for Administration and Planning, the Geologic Data Officer, the Program and Support Officer, and the Advance Planning Officer. In addition, permanent Division staff comprises 46 geologists, 2 geochemists, 3 geophysicists, 4 seismologists (one position is vacant), and 41 supporting technical, editorial, and clerical personnel.

HIRED

Assistant Geologist	Edward J. Bortugno
Librarian	Angela Brunton
Geologic Aid	Gordon L. Campbell, Michael W. Manson
Laboratory Technician	Marcos R. Loza
Senior Stenographer	Josephine M. Territo (return from leave)
Stenographer II	Laura B. Carter (reinstatement)
Clerk-Typist II	Judith E. Salmen
Key Data Operator Trainee	Leslie H. Pollock

SEPARATED

Senior Geologist	Roger W. Greensfelder
Associate Geologist	Thomas H. Rogers
Senior Librarian	Mary R. Weinstein
Geologic Aid	Peter Helander
Stenographer	Marie R. Guanco
Clerk-Typist II	Barbara J. Fong
Clerk-Typist I	Erma J. Ernest

PROMOTED

Senior Geologist	C. Forrest Bacon, Charles C. Bishop, Earl W. Hart, Paul K. Morton, Tom M. Wootton
Associate Geologist	John W. Williams
Assistant Geologist	Gary C. Taylor
Assistant Geologist (B)	Charles F. Armstrong, Theodore C. Smith, David L. Wagner
Geologic Drafting Technician	Donald R. Anderson
Senior Clerk-Typist	Joanne M. Traer
Clerk-Typist II	Vicki L. Forrester

TRANSFERRED

Los Angeles District Office	William B. Clark, Associate Geologist
Headquarters Office	Marilyn F. Dayton, Stenographer

PERMANENT DIVISION STAFF MEMBERS ON 30 JUNE 1975

EMPLOYEE	CLASSIFICATION	LOCATION
James E. Slosson	State Geologist	Headquarters
Thomas E. Gay, Jr.	Chief Deputy State Geologist	Headquarters
Rudolph G. Strand	Senior Geologist, Acting Deputy for Administration and Planning	Headquarters
Carl J. Hauge	Associate Geologist, Geologic Data Officer	Headquarters
Tom M. Wootton	Senior Geologist, Program and and Support Officer	Headquarters
Robert Streitz	Senior Geologist, Advance Planning Officer	Headquarters
John T. Alfors	Supervising Geologist, District Geologist	Sacramento
C. Forrest Bacon	Senior Geologist, Assistant District Geologist	Sacramento
Cliffton H. Gray, Jr.	Supervising Geologist, District Geologist	Los Angeles
Paul K. Morton	Senior Geologist, Assistant District Geologist	Los Angeles
Richard M. Stewart	Supervising Geologist, District Geologist	San Francisco
Charles C. Bishop	Senior Geologist, Assistant District Geologist	San Francisco
Rodger H. Chapman	Senior Geologist	Sacramento
Charles W. Chesterman	Senior Geologist	San Francisco
George B. Cleveland	Senior Geologist	San Luis Obispo
James R. Evans	Senior Geologist	Headquarters
Earl W. Hart	Senior Geologist	San Francisco
Mary R. Hill	Senior Geologist	Headquarters
Charles W. Jennings	Senior Geologist	San Francisco
Perry Y. Amimoto	Senior Engineering Geologist	Headquarters
Edward C. Sprotte	Petroleum Geologist	Los Angeles
Allan G. Barrows	Associate Geologist	Los Angeles
John L. Burnett	Associate Geologist	Sacramento
William B. Clark	Associate Geologist	Los Angeles
Michael E. Huffman	Associate Geologist	San Francisco
James E. Kahle	Associate Geologist	Los Angeles
Frederic R. Kelley	Associate Geologist	San Francisco
Michael P. Kennedy	Associate Geologist	San Diego
Salem J. Rice	Associate Geologist	San Francisco
Richard B. Saul	Associate Geologist	Los Angeles
Melvin C. Stinson	Associate Geologist	San Francisco
F. Harold Weber, Jr.	Associate Geologist	Los Angeles
John W. Williams	Associate Geologist	San Francisco
Glenn A. Borchardt	Associate Geochemist	San Francisco
Hasmukhrai M. Majmundar	Associate Geochemist	San Francisco

John H. Bennett	Associate Geophysicist	Sacramento
Gordon W. Chase	Associate Geophysicist	Sacramento
William M. Wells	Associate Geophysicist	Sacramento
Donald A. Rodgers	Associate Seismologist	Sacramento
Roger W. Sherburne	Associate Seismologist	Sacramento
Tousson R. Toppozada	Associate Seismologist	Sacramento
Charles F. Armstrong	Assistant Geologist	San Francisco
Quintin A. Aune	Assistant Geologist	Sacramento
David J. Beeby	Assistant Geologist	Los Angeles
Edward J. Bortugno	Assistant Geologist	San Francisco
Donald L. Fife	Assistant Geologist	Los Angeles
Robert L. Hill	Assistant Geologist	Los Angeles
Edmund W. Kiessling	Assistant Geologist	Los Angeles
Russell V. Miller	Assistant Geologist	Santa Ana
Jay H. Power	Assistant Geologist	Sacramento
John S. Rapp	Assistant Geologist	Sacramento
Charles R. Real	Assistant Geologist	San Bernardino
Trinda B. Ristau	Assistant Geologist	Headquarters
Drew P. Smith	Assistant Geologist	Los Angeles
Theodore C. Smith	Assistant Geologist	San Francisco
Yvor H. Smitter	Assistant Geologist	Headquarters
Siang S. Tan	Assistant Geologist	Santa Ana
Gary C. Taylor	Assistant Geologist	Sacramento
David L. Wagner	Assistant Geologist	San Francisco
Mary C. Woods	Assistant Geologist	Headquarters
Leslie Morrow	Civil Engineering Technician II	Sacramento
Harry P. LaGesse	Electronics Technician	Sacramento
Lydia Lofgren	Laboratory Technician	San Francisco
Marcos R. Loza	Laboratory Technician	San Francisco
Charles B. Smith	Laboratory Technician	San Francisco
Gordon L. Campbell	Geologic Aid	Sacramento
Ernest C. Durrwachter	Geologic Aid	Sacramento
William F. Genthe	Geologic Aid	San Francisco
Michael W. Manson	Geologic Aid	Los Angeles
Duane A. McClure	Geologic Aid	San Francisco
R. Merl Smith	Publications Supervisor	Headquarters
Richard R. Moar	Senior Geological Drafting Technician	San Francisco
Donald R. Anderson	Geological Drafting Technician	San Francisco
Richard T. Boylan	Geological Drafting Technician	Headquarters
Dorothy Y. Fong	Geological Drafting Technician	Headquarters
Edward L. Foster	Geological Drafting Technician	Headquarters
Elizabeth M. Lindgren	Geological Drafting Technician	Los Angeles
Vivian W. Muston	Geological Drafting Technician	Headquarters
Robert R. Switzer	Geological Drafting Technician	San Francisco
Jeffrey O. Tambert	Geological Drafting Technician	Headquarters
Ronald L. Morgan	Graphic Artist	Headquarters
Angela Brunton	Librarian	San Francisco
Judith A. Toole	Library Technical Assistant	San Francisco
Mary L. Burgess	Secretary I	Headquarters

Dorris P. Campbell	Senior Stenographer	Sacramento
Josephine M. Territo	Senior Stenographer	San Francisco
Eleanor M. Learned	Senior Information Clerk	San Francisco
Wilma L. Ashby	Senior Clerk-Typist	Los Angeles
Gloria Tomei	Senior Clerk-Typist	Sacramento
Joanne M. Traer	Senior Clerk-Typist	Headquarters
Margaret W. Turner	Senior Clerk-Typist	Headquarters
Beryl Adrian	Stenographer	Sacramento
Laura B. Carter	Stenographer	San Francisco
Suzanne L. Cross	Stenographer	Headquarters
Marilyn F. Dayton	Stenographer	Headquarters
Venice Huffman	Account Clerk II	Los Angeles
Vicki L. Forrester	Clerk-Typist II	Headquarters
Dorothy L. Hamilton	Clerk-Typist II	San Francisco
Marianne K. Roja	Clerk-Typist II	San Francisco
Judith E. Salmen	Clerk-Typist II	Headquarters
Sue Torres	Clerk-Typist II	Los Angeles
Betty E. Van Den Berg	Clerk-Typist II	San Francisco

TEMPORARY EMPLOYEES

The Division has participated in various Federal, State, and locally funded student aid programs throughout the year. At one time or another, the Division has utilized the services of two College Work-Study students and nine Neighborhood Youth Corps participants.

Nine Student Assistants were employed in full or part-time positions during the year, and three non-paid Volunteer Government Interns were employed in field assignments.

DISTRICTS

LOS ANGELES

The Los Angeles District serves all of southern California; it comprises an eleven county area bounded on the north by, and including, the counties of San Luis Obispo, Kern, and Inyo. District headquarters is located in the Junipero Serra State Building at First and Broadway in the Los Angeles Civic Center.

The District staff includes 17 geologists, 1 geologic aid, 1 drafting technician, and 3 secretaries. Some geologists work from small field offices near their projects; currently these are at San Diego, San Luis Obispo, Santa Ana, and UCLA. District headquarters maintains a public information center as well as a small technical library.

The bulk of the project work of the district involves cooperative investigations with local counties and the U.S. Geological Survey, and is concerned primarily with geologic hazards and environmental geology as it relates to proper land use. During the current year these investigations have concentrated heavily upon active and potentially active faults. Comparatively less effort was devoted to mineral resource studies.

SACRAMENTO

The Sacramento District office, located at 1416 Ninth Street, Room 118 in Sacramento, provides geologic services to 30 counties in the central inland and northeastern California. In addition, this District office provides geophysical and seismological services to the entire State.

District efforts have focused upon crustal deformation and seismicity with a view toward developing an earthquake-warning system by identifying precursors to damaging earthquakes. Geological work has emphasized mineral resources and the evaluation of environmental considerations in land development.

The District staff consists of 6 geologists, 3 geophysicists, 3 seismologists, 2 geologic aides, 1 secretary, and 1 information clerk.

During the fiscal year the Strong-Motion Instrumentation section, formerly housed in the District office, was moved to separate quarters in Sacramento.

SAN FRANCISCO

The San Francisco District office, which has been housed in the historical landmark, the Ferry Building, since 1896, covers a working territory of 17 counties in northern and central coastal California. This includes approximately two-thirds of the California seacoast, most of the central and northern Coast Ranges, and much of the very active San Andreas and related faults.

Several Division-wide facilities exist in this District office: the Geochemical Laboratory which provides analytical and testing support to Division staff; Map Room, in which are compiled and prepared various maps such as the Geologic Map of California series; the Division's large and complete technical reference Library; and one of the largest Mineral Museums on the west coast.

Many cooperative projects with various San Francisco Bay area counties and the U. S. Geological Survey have been undertaken by this office. The main emphasis is on geologic hazards and seismic safety, with a lesser effort in mineral resources activities. The Alquist-Priolo Special Studies Zones program also is conducted in this office.

The District staff comprises 14 geologists, 2 geochemists, 3 laboratory technicians, 2 geologic aids, 3 draftsmen, 2 librarians, 4 secretaries and clerks, 2 information clerks, and 1 janitor. There is one field office in Santa Rosa.

ENVIRONMENTAL AND ECONOMIC GEOLOGY ELEMENT

Geologic Hazards

In the interest of public safety and geologic hazards mitigation, the Division in recent years has been concentrating a significant portion of its effort in areas where urban development is or will be taking place and where geologic hazards can cause loss of life or limb and property or monetary losses. It is hoped that these geologic/seismic data will be effectively utilized by both local and State government agencies and the private sector. Experience and information recorded in the literature have shown that losses can be significantly reduced when (1) these data are used by those with expertise in the geological sciences, and (2) reports prepared from the data are reviewed by those with similar expertise. The increased cost associated with such improved performance has been very insignificant and the cost benefits ratios have been well in excess of 10 to 1 in favor of taking preventive measures before the disaster occurs. In addition, a very apparent reduction in loss of life can be correlated with enforcement of up to date building codes.

California cities, such as Los Angeles, Thousand Oaks, and San Jose, and counties, such as Los Angeles, Orange, Ventura, Santa Barbara, Kern, and Santa Clara, have recognized the geologic hazards indigenous to their areas and are adequately utilizing and enforcing Chapter 70 of the Uniform Building Code as required by Sections 17922, 17951, 17952, 17953, 17954, 17957, 17958, 1795.5 of the Health and Safety Code and Section 1090 of Chapter 25 of the California Administrative Code, and Sections 65302 and 65302.1 of the Government Code. These regulations require that each city and county recognize and record the geologic and seismic hazards inherent to their specific geographic areas. Many have complied and have prepared their Seismic Safety and Public Safety geologic hazard elements for their General Plans. Some have yet to complete this State-mandated obligation. Some of these elements appear to be of good quality, some of acceptable quality, and some, possibly a significant percentage, may be well below "state of the art" capabilities. Cities and counties where these elements are below "state of the art" capabilities may be faced with unnecessary loss of property and life and limb. It is recommended that legislation be introduced requiring that all General Plans be submitted to the Office of Planning and Research. The Office of Planning and Research in turn should transmit the elements to the involved state agencies for review and critique, e.g., the Seismic Safety element and the Public Safety geologic hazard portion of the Public Safety element to the Division of Mines and Geology for review.

Division of Mines and Geology Bulletin 198, published in 1973, indicated that almost 10 billion dollars in losses from geologic hazards and 21 billion dollars in losses from seismic hazards could occur within the next 25 years if mitigating measures are not taken and enforcement of codes and regulations (i.e., Chapter 70 U.B.C.) are not mandated. In 1973-74, SB 1983 was introduced to encourage the development of capabilities of the majority of the local governments not now adequately utilizing and/or enforcing Chapter 70 of the Uniform Building Code to

both use and enforce it and to require the integration of Chapter 70, U.B.C., with the Seismic Safety and Public Safety geologic elements of the General Plan. This bill was passed by both the Senate and Assembly, but was vetoed by the Governor. In 1975 similar legislation (SB 1216) was introduced and hopefully will be passed and enrolled. This type of responsbile legislation can provide the public with safer living conditions as well as a reduction in monetary losses. These objectives can be accomplished at a reduction of overall cost to the citizen when the cost benefits are considered.

Cooperative studies with local governmental agencies, other State agencies, and Federal agencies have enabled the Division to broaden its scope and its knowledge/data bank. The data thus obtained is in turn published and released for public use. These projects include cooperative studies related to the San Andreas, Elsinore, and Malibu-Santa Monica-Raymond fault systems, and geologic/seismic studies of portions of San Diego, San Bernardino, Orange, Los Angeles, Ventura, Santa Clara, Marin and Sonoma counties. Continuation of cooperative studies has been programmed for fiscal year 1975-76.

Other projects related to geologic/seismic hazards that will directly or indirectly benefit the people of California and increase public safety by reducing losses of life and property are the Alquist-Priolo Special Studies zone program, the Strong-Motion Instrumentation Program, and the continuing effort by the engineering/environmental geologic section to provide guidelines for the preparation of reports (i.e., CDMG Note 44: "Guidelines for the Preparation of Engineering Geology Reports"). In addition, the Division has continued and is expanding its efforts and capabilities in the review and preparation of EIRs, review and assessment of reports submitted in compliance with SB 519 (1973), the Hospital Building Safety Act, and assessment of the geologic environment of The Geysers Geothermal Resource Area. The Division has also provided assistance to the Solid Waste Management Board, Geothermal Resources Board, Coastal Zone Conservation Commission, State Lands Commission, Division of Forestry, Department of Parks and Recreation, Department of Water Resources, Attorney General's Office, and Office of Emergency Services in the areas of environmental geology, engineering geology, and geophysics/seismology.

Basic Geology

The basic geology program activity consists of areal geologic mapping and geologic compilation that is fundamental to mineral resource, engineering geology, and general land-use analyses. The basic objective is to understand and describe the distribution of rock units, their ages, their structural configuration, their geologic settings, and their physical properties to enable the State to advise in all matters concerning the geology of any part of the State. Among other results, such investigations have produced most of the knowledge concerning the location of faults in California.

Currently, this activity is being carried on at a nominal level. Basic geologic mapping in progress is incidental to environmental geology investigations, but basic geologic mapping per se is not now

being conducted by the Division. Compilation activity has focused upon completing the 1:750,000 scale map, and some effort will continue to be required to revise outdated 1:250,000 scale geologic map compilations.

Geochemistry

The mission of the Geochemical Section is to provide geochemical support to other Division project activities and to work on Geochemists' own projects. The workload is considerable and during the year about 400 samples were processed.

Considerable effort was directed toward procedures development for the optical emission spectrograph and the atomic absorption spectrophotometer. Detection limits and time of analyses were established and made known to the staff for arsenic, cadmium, cobalt, copper, iron, lead, magnesium, mercury, nickel, phosphorous, potassium, and zinc. Existing procedures were improved, and new procedures were developed. Four separate synthetic standards were prepared, and procedure for total of 40 elements were developed for optical emission spectrographic analysis.

Procedures for clay studies were improved. Various modified apparatus were assembled for analyzing the clay samples by x-ray diffraction procedures under controlled atmosphere.

Minerals

The minerals program was greatly expanded in fiscal year 1974-1975, largely through U.S. Bureau of Mines grants totalling $174,000. CDMG minerals staff now totals 14 people: 13 at the technical level and 1 at the clerical level. $100,000 of the grant money will fund statewide studies of both chromite and manganese; $50,000 will fund a study of the aggregate resources of the five county area surrounding greater Los Angeles to begin in fiscal year 1976. The remaining $24,000 will be spent in a statewide investigation of California's nickel resources.

The mineral activities section was augmented by the assignment of one geologist in each of the three district offices of the Division. Their jobs are to increase our knowledge of the mineral industry - its operations, activities, production, and marketing and other mineral related activities.

Because of the increasing need to be more precise in discussions and reports concerning minerals, a series of mineral terms were defined and adopted for offical use by the Division (see California Geology, October 1974).

In the hope of eventually hiring a much needed mineral economist, specifications for this new position were developed and submitted for approval by the State Personnel Board.

Marine Geology

The major efforts in marine geology during fiscal year 1974-75 were directed to complete the offshore geologic map of California. The map has been completed, field checked, and final drafting is underway. It is anticipated that a multi-colored version will be published before the end of the 1975 calendar year.

Ten EIR's were reviewed. Many of these related to the disposal of treated wastewater into the marine environment from new or improved wastewater treatment facilities. Information and reviews were provided to the California Coastal Zone Conservation Commission in their permit review procedures and in the development of their Preliminary Coastal Plan.

Steps were taken to initiate a study of the coastal areas of San Francisco, San Mateo, Santa Cruz, and Monterey Counties. This study would be directed toward detection and delineation of geologic hazards as they relate to coastal development. Attention would be given to the increasingly critical problem of the depletion of needed mineral resources, such as sand and gravel.

Marine geologic data were provided to Santa Clara and Sonoma Counties, and the City of San Diego as part of the CDMG's cooperative projects.

Geophysics and Seismology

The Division is increasingly active in the collection of, interpretation of, and dissemination of basic geophysical and seismological data. These data form a basis for the wise management of Earth's resources, minerals, and surface area. New data were collected during fiscal year 1975 and old data were re-examined in the light of new problems. All of these data were used to identify potential geologic hazards of a primary and secondary nature and to provide basic information for identifying areas in need of more intensive investigations.

Geophysical field support was provided for several cooperative investigations in the form of magnetic surveys, gravity surveys, seismic refraction surveys, and electrical resistivity surveys. These surveys provided information pertinent to the determination of local bedrock and/or water table depth, identification of buried faults, the variation in thickness of subsurface strata and the variation of seismic velocity of local rock units. Approximately 135 km of profiles were obtained by the application of these methods (magnetic = 85 km, gravity = 30 km, seismic = 19 km, resistivity = 1 km). Eight cooperative geophysical investigations were undertaken or continued during fiscal year 1974-75; these were Juniper Hills and Palmdale in Los Angeles County, Orange County, Ventura County, Sonoma County, Santa Monica-Raymond Hills (USGS), Elsinore fault-north (USGS), and Santa Clara County.

During the past year, the Trona and Santa Rosa sheets of the California Bouguer gravity map (scale 1:250,000) were published. Four other Bouguer gravity maps (Ukiah, Los Angeles, Bakersfield, and San Jose) were processed and are expected to be published in fiscal year 1975-76.

Due to the interest in geothermal resources the Division published a geophysical study of the Clear Lake-Geysers area in northern California (Special Report 116).

Geophysical field support, primarily in the form of magnetic surveys, was provided for the nickel-cobalt study of the minerals program. These surveys provided information relative to tracing of possible nickel or cobalt ore zones beneath soil or alluvium cover.

A geophysical study that provides information on possible undeveloped clay, sand, and lignite resources in the Ione area of northern California was completed and is to be published during the next fiscal year.

The Division's seismology section has provided assistance to other State agencies, local governments, and to industry; these activities have been performed both as contractual agreements, and informally as a program-related activity.

Compilation of earthquake data prior to 1932 is continuing. A study relating earthquake magnitude to seismic intensity data was complete and will be published during late 1975; this study was important because for earthquakes prior to 1932 instrumental magnitudes are not generally available. The utilization of pre-1932 information with post-1932 data requires an assessment of this earthquake parameter (magnitude). A sample of pre-1932 data is now being prepared for dissemination. A seismic intensity data set was obtained from NOAA; corrections to these data have been collected and prepared for inclusion in the California Earthquake Catalog. Seismic safety elements, and hospital site evaluation require the availability of this data set. The earthquake catalog has been a substantial aid to the seismic review associated with EIRs and EISs, and the evaluation of the seismic review of potential hospital and power plant sites. During the past fiscal year approximately 162 hospital reviews were completed. Basic data were obtained from the catalog for the final review of the Sonoma and Orange county cooperative studies.

Through cooperative investigations with other governmental organizations local and regional seismicity and intensity maps have been prepared for the Ventura County cooperative investigation.

A seismographic recorder has been on display in the lobby of the Resources Building since October 1974. The signal is generated at the San Luis Dam seismograph station of the California Department of Water Resources; the recorder is on loan from the Kinemetrics Co., Inc., of San Gabriel, California. This display serves to inform the public of current seismic activity with the State as well as outside the State. This display, for the first time ever, provides the Division with real time information pertinent to the seismic regime of California.

It is important to know where earthquakes have occurred because earthquakes will probably occur there again. It is also important to understand why earthquakes occur, and perhaps identify new areas where they might occur. A study of crustal deformation and the stress accumulation with the Transverse Ranges has been completed and a report is currently under review; several areas were identified as potential locations for damaging earthquakes.

Other methods have been applied to the study of prominent faults within California with the goal of identifying crustal strain, a program conducted in conjunction with the USGS.

A total of 68 geodetic line measurements were made during the year, including the first set of remeasurements. Measurements were made along new lines across major faults between the San Andreas fault and the Pacific Ocean in the vicinity of Morro-Estero Bay, San Luis Obispo County. A progress report and catalog of all previous measurements was prepared for publication during 1975. The USGS is decreasing its effort in this area of study suggesting that CDMG will necessarily have to increase its effort.

Very accurate short-range measurement of fault displacements in the Parkfield-Cholame Valley were continued. These measurements, when combined with the longer-range (10-30 km) Geodimeter measurements are now providing new understanding of the continuing crustal deformations occurring along the fault. Remeasurement of two lines near the Parkfield confirm geologic and creep data showing that crustal strain had occurred along the San Andreas fault south of Parkfield. Such data support the contentions of some theorists that this is an area of strain accumulations. This effort of geodetically monitoring faults is to be expanded next fiscal year and should be accompanied by temporary short period observations of the seismic regime.

In addition to geodetic measurements, the Division has, during fiscal year 1975, conducted fault instrumentation studies using (1) microacoustic equipment to detect possible audible cracking and popping which may occur in rock prior to an earthquake; (2) tiltmeters to measure land surface tilting which may precede a quake; (3) telluric current measuring equipment to compare rock resistivities and look for local earth current variations; and (4) gravimeter studies to see whether local gravity changes occur prior to, during, and after a quake.

Six sites extending from Parkfield southward to Palmdale have been selected and monitored for acoustic emissions along the San Andreas fault and two additional sites north of Parkfield are planned for the next fiscal year. Data recorded and analyzed to date show promise that the method may provide a useful tool in earthquake prediction. A report on the progress of this study was prepared for release in California Geology.

Division tiltmeters were operational at Gold Hill, Dillard, and Las Yeguas during the early part of fiscal year 1973-74, and later at Gold Hill, Pit, Thomason, and Eade Ranches. Because of a potential for increased earthquake activity in the Parkfield area and because electro-optical measurements showed diminished activity in their installation area, the Las Yeguas and Dillard instruments were relocated to the Parkfield vicinity, thus providing the Division with four tiltmeter sites between Cholame Valley and Middle Mountain north of Parkfield. Tiltmeters operated by the U.S. Geological Survey were apparently successful in providing precursory warnings of a moderate earthquake that occurred near Hollister on Thanksgiving Day 1974. A small earthquake which occurred in the Parkfield vicinity in January 1975 was picked up by the Division instruments and may have caused precursory deflections on at least one CDMG

instrument. Continued monitoring of the earthquake activity in the Parkfield area is expected to provide verification of this precursory tilting phenomenon.

Four telluric current sites were selected and instrumented along a 45-mile segment of the San Andreas fault system south of Parkfield and a fifth site was set up and instrumented, 3 miles northwest of Parkfield, to monitor activity associated with the January 1975 Parkfield earthquake. Preliminary analyses of telluric records preceding that event were promising enough so that two of the sites have been placed on permanent fulltime recording status to monitor telluric current phenomena that are precursors to an earthquake. Fulltime recording is planned for two other stations in fiscal year 1975-76.

A series of 50 gravity meter leveling stations was established both along and crossing the San Andreas fault between Carrizo Plains and the town of Parkfield. Gravity data are being accumulated every 3-6 months to establish confidence limits and to provide a background against which to compare local gravity variations thay may precede an earthquake. A report detailing these instrumentation activities is being prepared for release in late 1975.

Environmental Impact Reports

The Division has continued to review Environmental Impact Reports (EIRs) in 1974-75; however, a new policy of reviewing only EIRs submitted through the State Clearinghouse system was adopted. In all, approximately 262 reports were reviewed by the staff. This is a decrease of about 5 percent from a year earlier.

Division reviews are still concerned primarily with the geologic hazards evaluation presented in the report. This includes the impact the project might have on the hazards as well as the impact of potential hazards upon the project. Landsliding, erosion, expansive soil, volcanic eruption, tsunami, and subsidence are the geologic hazards considered. Special emphasis is placed upon the consideration of the evaluation of earthquake shaking and fault rupture. Mineral resource conservation and mined land reclamation sections are also given close examination.

Solid Waste Management

The Division continues to serve the Solid Waste Management Board by an appointment to the Resource Recovery Advisory Council. It reports on: geologic studies for Class 1, Class 2, and Class 3 disposal sites; containment standards for Class 1 sites; and rational location criteria for Class 1, Class 2, and Class 3 disposal sites. Economic studies of all

types of disposal systems were begun; and evaluations of aluminum can recovery by magnetic tagging methods, transportation of refuse by slurry pipeline, pyrolysis for energy recovery, and dry-fueling for boiler feed were provided.

The rapid growth of the need for geologic input (studies) in the solid waste management fields has indicated that full-time geologic staff will be required very soon. Hopefully the State Solid Waste Management Board will contract for this service with CDMG to allow for maximum efficiency of manpower and funds.

Hospital Safety Act

The Hospital Safety Act calls for the Department of Health to adopt rules and regulations for the design and construction of hospitals. The Division of Mines and Geology, in cooperation with the Department of Health and in agreement with the Office of Architecture and Construction, reviews reports of proposed hospitals to determine if the geologic environment of the sites is adequately described.

For the 1974-75 fiscal year 162 reports were reviewed. This is 40 percent more than for 1973-74. The review procedure involves a standard check-sheet analysis and follow up telephone contact with the preparer when necessary. Guidelines for preparers of reports (registered geologists) and sample check-sheets are available from the Division.

Alquist-Priolo Special Studies Zones Act

The objectives of this Act are twofold. One is to provide for public safety by prohibiting certain types of construction astride traces of faults along which surface fault rupture may occur. The other is to provide consumer protection by assuring that notification of established zones and the significance thereof is imparted to prospective buyers of real property situated within such zones.

The Division of Mines and Geology has the responsibility to delineate the Special Studies Zones about potentially active faults in California. Once the zones have been made official, the permitting agency must, under certain circumstances, require that geological investigations be conducted to ascertain the presence or absence of faults so as to avoid such faults in construction.

On July 1, 1974, the initial group of 175 Official Maps establishing Special Studies Zones about the San Andreas, Hayward, San Jacinto, and Calaveras faults was issued by the State Geologist. The maps, which identify the zones, also depict the identified fault traces. They are presented on 7 1/2-minute, 1:24,000 scale topographic base maps of the U.S. Geological Survey.

Delineation of additional fault zones was done during the fiscal year 1975. The 87 maps produced will become official on January 1, 1976 after completion of periods prescribed by law for review and revision. The faults zoned in this second group are the Rodgers Creek-Healdsburg, Antioch, San Gregorio, Fort Sage, Ownes Valley, White Wolf, Kern Front, Buena Vista, Gralock, San Fernando, Newport-Inglewood, and an unnamed fault in Imperial County.

Future zoning will follow evaluations of additional faults. The Sierra Madre-Cucamonga, Raymond Hill, and Elsinore faults have been evaluation and selected for zoning so far.

The Division published Special Publication 42 "Fault Hazard Zones in California" to inform the public and concerned government officals of the law, its implementation, and its intended effect.

Strong Motion Instrumentation Program

The Strong Motion Instrumentation Program operating from Sacramento completed its third year of operation. During this year, the Advisory Board recommended that the following sites be instrumented during fiscal years 1974-75 and 1975-76.

72 free-field sites in different geological and fault areas,
3 down-hole arrays,
12 dams,
4 surface arrays, and
54 buildings.

Standard 3-axis accelerographs will be used for the free-field sites, dams, and surface arrays for a total of 194 instruments. The three down-hole arrays and 54 buildings will be instrumented with a central recorder and remote accelerometers.

During this year, 37 free-field sites, 2 dams, and 2 buildings have been instrumented. There are now a total of 196 instruments in operation.

The dams chosen to be instrumented were in cooperation with the California Department of Water Resources, Division of Safety of Dams. The buildings were chosen in consultation with the Structural Engineering Association of California, and the surface arrays in cooperation with the U.S. Geological Survey.

The technical staff now assigned to the program consists of a geophysicist, two geologists, an engineering technician, and an electronics technician. In order to carry out the recommendations of the Advisory Board, plans are now being made to add two electronics technicians and one electrician to the staff.

STRONG MOTION INSTRUMENTATION ADVISORY BOARD

Members	Representing
H. BOLTON SEED (Chairman) Department of Civil Engineering University of California, Berkeley 94720	University of California Earthquake Engineering Research Center
FRANK K. McCLURE (Vice Chairman) McClure & Messinger 4009 Webster Street, Oakland	Structural Engineering
WILLIAM K. CLOUD Seismographic Station University of California, Berkeley 94720	University of California Seismographic Stations
L. LEROY CRANDALL LeRoy Crandall & Associates 711 N. Alvarado Street, Los Angeles 90026	Structural Engineers Association of California
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ALFRED GOLDBERG Superintendent of Building Inspection City and County of San Francisco 450 McAllister, Rm. 202, San Francisco 94102	International Conference of Building Officials
MARY W. HENDERSON (Vice Mayor, Redwood City) 3098 Muller Court, Redwood City 94601	League of California Cities
DONALD E. HUDSON California Institute of Technology Pasadena 91109	California Institute of Technology Earthquake Engineering Research Laboratory
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R. B. MATHIESEN Seismic Engineering U.S. Geological Survey 390 Main Street, Room 7067 San Francisco 94105	U.S. Geological Survey
JOHN F. MEEHAN Office of Architecture and Construction 1500 Fifth Street, Sacramento 95814	State Office of Architecture and Construction
L. DALE MILLS Kern County Director of Public Works 2601 O Street, Bakersfield 93301	County Supervisors Association of California
GORDON B. OAKESHOTT 3040 Totterdell Street, Oakland 94611	Public
KARL V. STEINBRUGGE Insurance Services Office 465 California Street, San Francisco 94104	State Mining and Geology Board

LISTS OF PROJECTS

URBAN MAPPING

Project	Staff	Status
Juniper Hills quadrangle (San Andreas fault)	Barrows	First draft completed at years end.
Pasadena quadrangle	Fife	Began mapping at years end.
Southwest San Bernardino County	Fife, Sprotte, Chase, Chapman	Headquarters review.
El Toro quadrangle	Fife	Special Report 110 released.
Southeast quarter Mint Canyon quadrangle	Saul	Mapping in progress.
National City, Imperial Beach, Otay Mesa quadrangles	Kennedy, Tan	First draft completed at years end.
San Diego City (six quadrangles)	Kennedy	In press.
South half Mt. Baldy and southwest quarter Glendora 7 1/2' quadrangles	Streitz	Report being revised.
South half Tustin quadrangle	Miller, Tan	Headquarters review.
South Cañada Gobernadora quadrangle	Morton	Special Report 111 released.
San Juan Capistrano quadrangle	Morton, Fife Edgington*	Special Report 112 released.
West Central Mt. Wilson	Saul	In press.
Laguna quadrangle	Tan, Edgington*	Headquarters review.
Calabasas and 1000 Oaks quadrangles	Weber	Headquarters review.
Southeast quarter Oat Mt. quadrangle	Saul	District review completed.
Southwest quarter Oat Mt. quadrangle	Evans	In press.

*Geologist no longer with CDMG.

URBAN MAPPING

Project	Staff	Status
Sonoma County county-wide study to assist in preparation of general plan elements	Huffman, Armstrong	Report and maps completed; preparation for publication in progress.
Santa Clara County, Monte Bello Ridge study, 1971-72	Rogers*, Armstrong	Report published as Preliminary Report 17.
Santa Clara County county-wide study to assist in preparation of general plan elements	Rogers, Williams	Report published as Special Report 107.
Marin County, Novato and Fairfax-Upper Ross Valley areas	Rice, T. Smith	Preliminary Report 21 revision completed; review in progress. Maps completed; copies to County.
Marin County: Pt. Reyes Station and San Geronimo Valley areas and Tiburon Peninsula	Rice	Investigations in progress.
Santa Cruz coastline study	Williams	Recessed.

SEISMICITY AND FAULT MOVEMENT

Project	Staff	Status
Newport-Inglewood fault review	Barrows	Special Report 114 released.
Santa Monica-Raymond Hill fault zone	Hill, Sprotte	In progress.
San Andreas fault zone: Leona Valley segment	Kahle, Beeby Smith	Rough draft completed at years end.
San Andreas fault zone: Palmdale segment	Kahle, Beeby, Smith	Fault trace map completed at years end.
San Diego fault study	Kennedy, Tan, Welday*	Headquarters review

*Geologist no longer with CDMG

Orange County fault study	Miller, Tan	First draft completed at years end.
Ventura County Seismic Safety	Weber, Sprotte, Kiessling, Cleveland	Rough draft completed at years end.
Elsinore fault zone, Riverside County	Kennedy, Weber	In progress; fault trace map completed.
San Fernando earthquake area	Barrows, Kahle, Saul, Weber	Miscellaneous map released
San Andreas fault, San Bernardino area	D. Morton*	Map of Devore 7 1/2' quadrangle, used in southwest San Bernardino County coop report. Project terminated.

ENVIRONMENTAL GEOLOGY

Project	Staff	Status
Landslides in marine terrace terrain	Cleveland	In press.
Landslides and climate (five separate investigations)	Cleveland	In progress; nearing completion.
Environmental geology of Orange County	Morton, Miller	First draft in District review
Environmental impact reports review	Staff	
Hospital site reports review	Fife, Hill	

AREAL GEOLOGY

Project	Staff	Status
Bodie quadrangle	Chesterman, Gray	In press.
Haiwee Reservoir and Keeler quadrangles	Stinson	Work completed for publication as Map Sheets. Review in process.

*Geologist no longer with CDMG.

Hollister and San Felipe	Rogers	Project completed; review of report and maps in progress.
North half Confidence Hills quadrangle	Troxel*, Wright*	In press.

GEOCHEMICAL

Project	Staff	Status
Nickel and cobalt in California	Majmundar, C. Smith	Completed MAS forms for U.S.B.M. Analytical work and sampling in progress.
Atomic absorption analysis of gold and silver	Majmundar, C. Smith	Work in progress for development of analytical procedure.
Mineral separation for potassium-argon age determinations	Majmundar, Lofgren, C. Smith	Separated biotite and hornblende from diorite.
Staining of carbonate minerals	Majmundar, C. Smith	Completed procedure development of staining various carbonate minerals.
Specific gravity determination	Majmundar, C. Smith	Completed procedure development of specific gravity determination of five aggregates by La Chatelier's method.
Optical emission spectrographic analysis	Majmundar, C. Smith	Completed preparing four synthetic standards and prepared the standard plates for the following: Standard I- B, Be, Co, Cr, Cm, Ga, Mn, Ni, Pb, Nb, Sn, Ti, V, & Ge; Standard II- Ag, An, Bi, Cd, In, La, Mo, Pd, Pt, Re, Sc, Y, Yb, & Zr; Standard III- As, Tl, Zn, Te, Hg, Sb, & W; Standard IV- Ce, Ca, Mg, Ba, Sr.

*Geologist no longer with CDMG

GEOCHEMICAL (continued)

Project	Staff	Status
Nickel and cobalt determinations by wet chemical methods	Majmundar, C. Smith	Work in progress of developing procedures to determine nickel and cobalt concentrations (in samples having more than 1% Ni or Co) by wet chemical methods.
Sampling boat technique for atomic absorption analysis	Majmundar, C. Smith	Work in progress for development of procedures to determine heavy metals at the parts per billion level.
Procedure development for As, Cd, Co, Cu, Fe, Pb, Mg, Hg, Ni, K, and Zn by atomic absorption spectrophotometer	Majmundar, Lofgren, C. Smith	Procedures are improved and new procedures for several elements were developed.
Monterey basin geochemical background studies on stream sediment samples	Majmundar, Lofgren, C. Smith	Completed final editing and submitted to the Project Committee of Monterey Basin Study to include as an appendix in the final report to the Governor.
Geochemical Study of Samples from Monterey County	Majmundar, Lofgren, C. Smith	Work in progress to combine the two reports on stream sediment and bed rock studies for CDMG publication as a Special Report.
Physical testing of soil samples	Majmundar, Borchardt, Lofgren, Loza	Used physical tests on sedimentary materials (particle size distribution and Atterberg tests); bulk and clay mineralogy determined by x-ray diffraction.
X-ray diffraction analysis of clay minerals	Majmundar, Borchardt, Lofgren	Work in progress for developing rapid procedure.
X-ray fluorescence analysis for nickel and iron	Majmundar, Borchardt, Lofgren	Procedure development work in progress.

Computer program evaluation	Borchardt	Work in progress.
Landslide studies and Chemical stabilization	Borchardt, Lofgren, C. Smith	Submitted report on x-ray diffraction and physical properties of 127 landslides and soils sampled along coastal California.
Quantitative mineralogy and engineering properties of clays	Borchardt, Lofgren, Loza	Preliminary work on condition with plasticity index in progress; developing new method for montmorillonite determination.

MINERAL STUDIES

Limestone, dolomite, and shell resources of the Coast Range Province	Hart	Manuscript in publication processing as Bulletin 197
Limestone and dolomite in the Mojave Desert and Basin and Ranges	Bowen*, Gray	Manuscript with author for review
Limestone and dolomite in the Transverse and Peninsular Ranges	Gray	Manuscript with author for review
Limestone and dolomite in the Sierra Nevada	Bowen*, Aune	Manuscript with author
Bodie mining district, Mono County	Chesterman, Gray, Chapman	Manuscript with author for review
Geology of the southern Mother Lode	Evans	Manuscript in geodata processing
Mine waste water and water use	Evans, Davis*	Manuscript in publication processing
Legal Guide	Tilden	Manuscript with author for revision
Sacramento County sand and gravel	Rapp	Manuscript in publication processing
Sierra Nevada mine wastes	Clark	In geodata processing
Striped Mountain carbonate rocks	Evans, Bowen*, Gray	In publication processing

*Geologist no longer with CDMG

Alpine County	Clark	In publication processing
Imperial County	Morton	In publication processing
Riverside County	Saul, Evans Gray	Open filed, pending publication
Nickel-Cobalt in California USBM grant study	Chesterman, Majmundar	Documents due to USBM complete, manuscript nearly complete, target area for detailed study outlined
Uranium in California	Rapp	Manuscript with author
Lime in California	Rapp	Manuscript in publication processing
Clay in California	Evans	Study in progress
Lead and zinc in California	Taylor	Study in progress
Zircon in California	Taylor	Study in progress
Mercury in California	Davis*	Study in progress
Diatomite in California	Clark	Manuscript with author for revision
Asbestos in California	Kelley	Manuscript with author for revision
Carbonate rocks resources	Evans	In publications processing
Precious metals in California	Clark	Manuscript with author for revision
Chromite in California USBM grant study	Stinson, Bogue, McCusker	Study in progress
Manganese in California USBM grant study	Burnett, Niemi, Deino	Study in progress
Iron and steel in California	Taylor	Study in progress
Mineralization in southern Mother Lode, Mariposa County	Evans	Study in progress
Ceramic grade sodium feldspar, San Bernardino County	Smitter, Clark	Study and manuscript complete

*Geologist no longer with CDMG

GEOPHYSICAL
(Other Than Seismic and Fault Investigations)

Project	Staff	Status
Telluric current self-potential	Bacon Durrwachter	Five arrays along San Andreas fault are being monitored - two continuously, the others monthly or intermittently.
Bouguer gravity map of California, scale 1:250,000	Chapman, Chase Bishop, Gasch*	Published: Trona, Santa Rosa In press: Ukiah, Bakersfield, Los Angeles, San Jose In progress: Santa Maria Needles, Fresno, Mariposa, Salton Sea, San Diego-El Centro
Bouguer map of California Scale 1:750,000	Chapman, Chase	North half completed; south half 65% complete
Aeromagnetic Map of California Scale 1:750,000	Chase	Compiled available data
Clear Lake-The Geysers study	Chapman	Published as SR 116
Ione Geophysical study	Chapman, Bishop	Being processed for publication as SR 117.
Port Wine area study	Chapman, Clark, Chesterman	Report in progress
Bodie Mining District	Chesterman, Gray, Chapman	See "Mineral resources" listing
Gravity leveling study	Chase, Chapman, Campbell	Monitoring selected stations for changes in gravity
San Luis-Ortigalita fault study	Buchholz Chapman	Report in progress

*Geophysicist no longer with CDMG

Project	Staff	Status
Geophysical support was provided for the following cooperative projects: Los Angeles County Orange County Santa Clara County Sonoma County Ventura County Santa Monica-Raymond Hills (USGS) Elsinore North (USGS)	Chapman, Chase Campbell	Results of the geophysical studies are, or will be, included in the final reports on the projects

MARINE GEOLOGY

Project	Staff	Status
Bottom lithology map of offshore areas, Oregon to Mexico; 1:500,000	Welday*, Williams	Map completed, final drafting underway, multicolor publication expected by end of 1975.
South San Francisco Bay Survey	Welday*, Williams	Study complete, report prepared.
San Diego offshore surveys	Welday*, Kennedy	Study complete, report prepared.

GEOLOGIC MAPS

Project	Staff	Status
Death Valley Geologic Map Sheet, Scale 1:250,000	Streitz, Stinson	Revision completed. Being reviewed prior to scribing.
Index to Geologic Maps, 1970-73	Kiessling	Recessed.
Index to source data used to compile State Geologic and Fault Maps, Scale 1:750,000	Jennings	Being prepared as Special Report, Geologic Faults and Formations of California.
State Fault Map, Scale 1:750,000	Jennings, Stinson	Preliminary version published as Preliminary Report 13; compilation for final version completed; drafting procedures in progress.
State Geologic Map, Scale 1:750,000	Jennings, Stinson	Compilation completed; drafting procedures in progress.

*Geologist no longer with CDMG

GEOLOGIC DATA ELEMENT

The objective of the Geologic Data Element is to provide the citizens of California with geologic information in a form that is relevant to their lives and livelihoods. The Geologic Data staff (4 geologists, 1 senior steno, and 2 clerk-typists) publishes and distributes the results of studies made by staff members of the California Division of Mines and Geology and others in the earth sciences profession. This is accomplished through the Division's special reports, bulletins, map sheets, special publications, and preliminary reports, by letter, by informal leaflets (CDMG Notes), by technical and semitechnical illustrated talks, by public exhibits, and by personal contact.

An information desk is maintained at each of the District offices staffed by a senior clerk or an information clerk. The Museum/Information Desk and Library at the San Francisco District help relate the importance of geology to the safety, welfare, and economy of California and its citizens. The library is staffed by 1 librarian and by 1 library technical assistant.

During the fall of 1974, a seismograph recorder was installed as a display in the lobby of the Resources Building in Sacramento. This popular exhibit has made observers aware of the daily occurrence of earthquakes throughout the world, and their special significance in California.

News releases are prepared and distributed to the media concerning the Division's publications which relate to a large audience, such as the recent cooperative reports on geologic/seismic hazards of portions of southern California counties, and landsliding along California's coastal terraces.

Information Desks and Mail Inquiries

Thousands of inquiries received annually by the Division are answered by supplying copies of the CDMG Notes, CALIFORNIA GEOLOGY, and by individual letter from a geologist if appropriate.

During the year interest in earthquakes and gold remained high. The "Gold Pak", a collection of 23 CDMG Notes, was mailed to 3096 persons. The Division's "Schoolite Kit", a collection of 50 hand specimens of rocks and minerals found in California, was sent to 114 schools. There has been an increase in requests for information on turquoise. The earthquake display at Cal-Expo resulted in an increase in mail requests for earthquake information; and new State legislation resulted in an increase in sales of Special Publication 42, Fault hazard zones in California.

Mineral Museum

The museum, located on the second floor of the Ferry Building in San Francisco, is open to the public from 8 a.m. to 5 p.m., Monday through Friday. Recent volunteer donations provided displays of gemstones, geodes, and garnets, and an exhibit on mineral identification. The preparation of one mineral display is rotated among the Bay area rock and mineral societies. Minerals from the museum are displayed in the Golden Gate Bridge Authority and the World Trade Center. The C. A. Logan bequest received recently provided additional minerals for the Dana Collection and other displays.

The Museum, along with the Library, and the 3 District information desks, are effective in providing information about earth sciences to California's citizens.

Library

A new librarian was appointed during the fiscal year and cataloging of recent library acquisitions is well underway. The library participated in an interlibrary loan cooperative project with the Bay Area Reference Center, a Federal entity.

The library also participates in interlibrary loan agreements with the California State Library, and public, private, university, and government libraries throughout the State and the county. Books from the CDMG library are available for loan to the public as well as to other government agencies and CDMG staff. The books housed in the library are a major and significant collection of earth science texts and periodicals.

The C. A. Logan bequest provided a number of U. S. Geological Survey geologic folios and some California Division of Mines and Geology publications which have been long out-of-print, geologic publications of other western states, and other geologic material of value to the library.

Publications

The Geologic Data staff prepares material for publication and distributes the results of technical studies of California geology as promptly, concisely, attractively, and economically as practicable. The staff reviews the technical content of manuscripts, drafts illustrations, does cartography of the maps, processes the manuscript and map editorially, coordinates the printing and lithography, negotiates contracts, manages the printing budget, and supervises the distribution of the final printed report. Revenue from the sale of Division publications during fiscal year 1974-75 was $110,000 - the largest to date.

New Publications Released

Bulletin 196. San Fernando, California, earthquake of 9 February 1971, edited by Gordon B. Oakeshott, $13.00.

Special Report 107. Potential seismic hazards in Santa Clara County, California, by Thomas H. Rogers and John W. Williams. $7.00.

Special Report 109. Geology of the Dana Point Quadrangle, Orange County, California, by William J. Edgington. $3.00.

Special Report 110. Geology of the south half of the El Toro quadrangle, Orange County, California, by Donald L. Fife. $3.00.

Special Report 111. Geology of the south half of the Canada Gobernadora quadrangle, by Paul Morton. $3.00.

Special Report 112. Geology and engineering geologic aspects of the San Juan Capistrano quadrangle, Orange County, California, by Paul K. Morton, William J. Edgington, and Donald L. Fife. $3.00.

Special Report 114. A review of the geology and earthquake history of the Newport-Inglewood structural zone, southern California, by Alan G. Barrows. $5.00.

Special Report 115. Index to graduate theses and dissertations on California geology, 1962 through 1972, by Gary C. Taylor. $3.00.

Special Report 116. Geophysical study of the Clear Lake Region, California, by Rodger H. Chapman. $1.25.

Special Report 118. San Andreas Fault in southern California, edited by John C. Crowell. $5.00.

Special Publication 43. The mineral industry of California, preprint from the 1972 U.S. Bureau of Mines Minerals Yearbook, distributed by cooperative arrangement. Free.

Special Publication 46. Second report of the Governor's earthquake Council. $2.00.

Map Sheet 20. Geology of the SE 1/4 Tecopa quadrangle, San Bernardino and Inyo Counties, California, by Lauren A. Wright. $2.50.

Map Sheet 23. Maximum credible rock acceleration from earthquakes in California, by Roger W. Greensfelder. $1.50.

Map Sheet 24. Geology of the Arroyo Grande quadrangle, San Luis Obispo County, California, by Clarence A. Hall. $4.75.

Preliminary Report 17. Environmental geologic analysis of the Monte Bello Ridge Mountain study area, San Clara County, California, by Thomas H. Rogers and Charles F. Armstrong. $7.00.

Geologic map of the San Fernando earthquake area, by A. G. Barrows, J. E. Kahle, R. B. Saul, and F. H. Weber, Jr. $2.00. (scale 1:18,000)

Santa Rosa sheet, Bouguer Gravity map of California, scale 1:250,000, compiled by Rodger H. Chapman and Charles C. Bishop. $4.00.

Trona sheet, Bouguer Gravity map of California, scale 1:250,000, compiled by Tor H. Nilsen and Rodger H. Chapman. $4.00.

Sixty-seventh Annual report of the State Geologist.

Publications reprinted

Special Publication 42. Fault hazard zones in California, by Earl W. Hart, revised edition, March 7, 1975. $1.00.

Special Publication 45. Meeting the earthquake challenge, by the Legislature's Joint Committee on Seismic Safety. $2.50. First reprint.

San Bernardino sheet (uncolored), Geologic map of California, scale 1:250,000, compiled by Thomas H. Rogers. $0.50.

Ukiah sheet (uncolored), Geologic map of California, scale 1:250,000, compiled by Charles W. Jennings and Rudolph G. Strand. $0.50.

List of Available Publications, 1975. Free.

Special Publication 46. Second report of the Governor's earthquake Council. First reprint.

Major articles in CALIFORNIA GEOLOGY

Relationship of mineralization to major structural features in the Mountain Pass area, San Bernardino County, California.
California scrap iron and the copper industry.
Origin of Lake Merced.
Fossils of the "Merced" Formation, Sebastopol region.
Repeatable high ground accelerations from earthquakes - important design criteria.
Hammonton dredge field.
Man-made diversion of Furnace Creek Wash, Zabriskie Point, Death Valley, California.
Loellingite and black vesuvianite from Tulare County, California.
Zoning for surface fault hazards in California: the new special studies zones maps.
Geology and land development in Ventura County.
Surprise Valley fault.
Geothermal activity in Surprise Valley.
Near surface fault detection by magnetometer.
Role of geologists in evaluating seismic risks.
Geology and the ancient bristlecone pine.
The Stanislaus River, a study in Sierra Nevada geology.
Summary of 1973-1974 legislation related to geology.

Historical tunnel at mussel rock.
Geological hazards along the coast south of San Francisco.
Legislation related to earthquakes.
Earthquake prediction and official warning.
Registration rules and regulations under geologist and geophysicist act.
The mineral industry of California in 1973.
The Flash flood at Nelsons Landing, Clark County, Nevada.
Role of mineral industry in state incomes.
Calcareous concretions in the Corcoran clay, western Merced County, California.
Cenozoic deformation along the Sierra Nevada province and Basin and Range province boundary, a field trip guide.
The Santa Barbara earthquake of 29 June 1925, fiftieth anniversary.
Seismicity of the eastern Santa Barbara Channel.
ERTS satellite images.
Sea cliff erosion, Isla Vista, California.

New CDMG Notes

41. Guidelines for CALIFORNIA GEOLOGY articles.
42. Resume of CDMG activities.
43. Recommended guidelines for determining the maximum credible and the maximum probable earthquakes.
44. Recommended guidelines for preparing engineering geologic reports.
45. Recommended guidelines for preparing mine reclamation plans.

Revised CDMG Notes

42. Resume of CDMG activities.

COOPERATIVE ACTIVITIES

The Division conducts a number of geological studies in cooperation with local governments, other State agencies, and Federal agencies. The studies are designed to meet the need for information about actual or potential areas of geologic hazard or for information about mineral resources. Some of the studies are conducted to demonstrate the need for, and the usefulness of, geology to local government planning, building, and public works agencies. Other projects are conducted to accelerate progress on Division projects or to enable the Division to begin projects sooner than could otherwise be done. Cooperative activities are funded jointly by the Division and the cooperating agency under various arrangements--the nature of which depneds upon the availability of funds and personnel, the relative urgency of the project to the State and to the cooperating agencies, and other factors.

LOCAL GOVERNMENTS

Los Angeles County

The Department of the County Engineer and the Los Angeles County Flood Control District provided funds to accelerate the Division's geologic studies in the county.

Los Angeles County, Department of the County Engineer, also provided funds to accelerate the Division's cooperative fault hazards study with the USGS (Earthquake Hazard Reduction Program) in the Leona Valley-Palmdale area of the County. Geologic, fault, and earthquake hazard maps of the Leona Valley area also the San Andreas fault were completed during the year as well as a fault map of the Palmdale area of the San Andreas fault.

Field mapping in progress: SE quarter of Mint Canyon, Pasadena quadrangles.

Reports in preparation: Juniper Hills quadrangle

S Half Glendora, SW quarter Calabasas, SE quarter Thousand Oaks, parts of Mt. Wilson, Oat Mountain, and Mint Canyon quadrangles.

Reports published: Special Report 114, "A review of the geology and earthquake history of the Newport-Inglewood structural zone, southern California".

Marin County

Geologic studies in the eastern part of the San Geronimo, southern half of the Novato and the northern half of the San Rafael 7 1/2 minute quadrangles were completed. A report discussing the results of the investigation in the Novato area was provided to the County of the City of Novato. Preliminary maps of the remainder of the area were given to the County.

The County provided additional funds to continue geologic investigations in the Pt. Reyes Station, San Geronimo Valley areas, and in a portion of the southeastern part of the County not previously mapped. This work, initiated in the fiscal year 1974-75, will continue well into the 1975-76 FY.

Field mapping in progress: Pt. Reyes Station, San Geronimo Valley quadrangles, and parts of the Corte Madera, Larkspur, and Mill Valley city areas.

Reports in preparation: San Geronimo (east), San Rafael (N half), and Novato (south half) quadrangles.

Reports being processed for publication: none

Reports published: none

Orange County

The Department of Building and Safety, the Road Department, and the Orange County Flood Control District provided funds to accelerate the Division's geologic studies in the county.

Field mapping in progress: none

Reports in preparation: Environmental geology of Orange County; Fault hazards of Orange County.

Reports being processed for publication: S half Tustin, Laguna quadrangles.

Reports published: Special Report 109, "Geology of the Dana Point quadrangle, Orange County, California"; Special Report 110, "Geology of the south half of the El Toro quadrangle, Orange County, California;" "Geology and engineering geologic aspects of the south half of the Cañada Gobernadora quadrangle, Orange County, California;" Special Report 112, "Geology and engineering geologic aspects of the San Juan Capistrano quadrangle, Orange County, California".

San Bernardino County

No funds were provided by the county for continued work, but a report on the geologic, geophysics and seismology of the southwestern part of the county was revised for publication as Special Report 113.

San Diego City

A report on the results of the San Diego fault study, a USGS Coop, was being processed for publication. No funds were provided for continued works in the county, but reports on the National City, Imperial Beach, and Otay Mesa quadrangles are ready for print.

Santa Clara County

A county-wide investigation of geologic hazards was completed and a report, including maps, was provided to the county during the first-half of the fiscal year. One of the products of the study was the development of the Geologic Investigation Needs Map. This map was useful in providing necessary data and technical support for the passage of an ordinance requiring geologic site investigations in hazardous areas indicated on the map.

The map divides the county into 3 general categories:

1. Areas in which engineering geologic site investigations are generally mandatory.
2. Areas in which the county geologist shall decide if a site investigation is required.
3. Areas where a site investigation is generally not required.

The report also supplies background and regional geologic information useful to the engineering geologic consultant as a framework for site investigations. The county geologist has also found it useful in providing information in determining the need for site investigations and in evaluating the resulting reports. The Division's work on this project was published as Special Report 107.

With completion of this more generalized county-wide study, the Division has entered in another contract with the county to do a detailed investigation in the foothills along the southeastern Santa Clara Valley. The emphasis here is on slope stability, fault rupture, and other geologic hazards along the surface trace of the Calaveras fault zone.

Field mapping in progress: Southern part of Diablo Range foothills

Reports in preparation: none

Reports being processed for publication: none

Reports published: Special Report 107, "Potential seismic hazards in Santa Clara County, California".

Sonoma County

Work, initiated last fiscal year, on a county-wide study to provide basic data for use by the county in preparing the seismic safety element of the general plan, was completed and presented to the county.

As a part of the county's continuing effort to recognize, and thereby take steps toward the mitigation of geologic hazards, the county asked the Division for further assistance. As a result, the Division entered into a contract to provide the county with a series of work plans for specific geographic areas. These work plans are designed to identify the geologic hazards, list the type of information required to analyze these hazards, recommend the types of investigations that should be performed to develop this information and estimate the cost of the work. This project was close to completion at the end of the 1974-75 FY.

STATE AGENCIES

State Office of Architecture and Construction

1. Hospital Safety Act

The Division continued to review reports under the provisions of the Hospital Safety Act (Health and Safety Code) which became effective 7 March 1973. This Act required that new hospitals including additions, reconstructions, and out-patient facilities shall be functional during and after an earthquake or other natural disasters.

During fiscal year 1974-1975 CDMG provided the review of 164 new and supplemental geologic/seismic reports for hospital sites which were submitted by consulting engineering geology firms to the State Office of Architecture and Construction (OAC).

In order to provide for fair, consistent and rapid review process the State Building Safety Board adopted CDMG Note 37 - "Guidelines to Geologic/Seismic Reports" and CDMG Note 43 - "Recommended Guidelines for Determining the Maximum Credible and the Maximum Probable Earthquakes" by way of reference into California Administrative Code, Title 17, Chapter 8, Safety of Construction of Hospitals.

A significant requirement for determining the maximum probable earthquake (100-year event) stated in CDMG Note 43 was that "the postulated magnitude shall not be lower than the maximum that has occurred within historic time". This has resulted in less statistical manipulation of seismic history data...sometimes resulting in an analytical conclusion which showed that the 1906 San Francisco Earthquake occurred once every 1000 years.

2. School Siting

A Division geologist testified before the State Public Works Board and stated that a comparative analysis as to the safety of school sites in Berkeley and Fremont for the deaf and blind would not be possible unless a detailed geologic study was made on the present site at Berkeley.

California Department of Real Estate

During a 4-month period in fiscal 1973-74 seventy-four subdivision reports were reviewed for geologic hazards, and the majority of the reports were found to be inadequate.

A new review procedure was adopted following termination of the old procedure in March 1974. During fiscal 1974-75 not one subdivision report was submitted by the Department of Real Estate to the Division of Mines and Geology for review. The new procedure has effectively put the burden on the buyer as to the safety of the site from geologic hazards.

State Water Resources Control Board

The Division's review of environmental impact reports on proposed waste water treatment facilities resulted in the preparation of CDMG Note 46, "Guidelines for Geologic/Seismic Considerations in Environmental Impact Reports". Because many of the Division's comments on the EIR's were adverse to the projects, the formulation of a guideline to be used during the preparation of the project reports should expedite the overall process in granting approval of acceptable projects. CDMG Note 46 is to be distributed with other guidelines prepared by the State Water Resources Control Board.

Division of Forestry

Until the last months of fiscal 1974-75 there was no relationship in activities between the Division of Mines and Geology and the Division of Forestry. Suddenly, there were three projects, including: 1) the feasibility of a fire station, 2) the effect of logging on water supply, and 3) landsliding in a logging area adjacent to a perennial stream.

It is expected that fiscal 1975-76 will involve CDMG to a greater degree in the activities of the Division of Forestry.

Division of Oil and Gas

The Division completed and will publish in early fiscal year 1975-76, Special Report 122, Engineering Geology of the Geysers Geothermal Resources Area, Lake, Mendocino, and Sonoma Counties. This report will be used with the "Master EIR guideline for the geothermal area at The Geysers" which is now under preparation by the Division of Oil and Gas and the Office of Program Development.

California Energy Resources Conservation and Development Commission

The Division of Mines and Geology is now preparing a guideline for geologic reports for offshore operations and facilities. It is hoped that the Division will be able to contribute to the proper development of energy resources with the minimum detrimental effect on public safety and the environment.

University of California at Berkeley

The Seismological Station provided the Division with detailed information on California earthquakes under the terms of a continuing agreement. The Division is notified by telephone of the location and magnitude of earthquakes greater than magnitude 5 in northern and central California so that an earthquake-response team may be deployed rapidly to evaluate potential geologic hazards in affected areas.

Other Cooperative Services

In addition to the funded coöperative or contract projects, the Division participated in a number of interagency activities. A partial listing of the inter-agency groups in which the Division was represented during the fiscal year is as follows:

Advisory Board to Strong Motion Instrumentation Program
Advisory Committee on Geographic Names
Advisory Group to Joint Legislative Committee on Seismic Safety
Archaeological Study Task Force
Building Safety Board (Department of Health)
Geothermal Resources Board
Governor's Earthquake Council
Governor's Interagency Earthquake Committee
Land Use Study Committee (Office of Planning and Research)
Monterey Basin Pilot Monitoring Project Committee
Power Plant Siting Committee
State Solid Waste Management Board
State Solid Waste Management and Resources Recovery Advisory Council
Technical Advisory Committee to Geothermal Resources Board
Technical Advisory Committee to San Francisco Bay Conservation and Development Commission

In addition to services furnished on a continuing basis, the Division provided a wide variety of short-term services to other State agencies upon request.

FEDERAL AGENCIES

U. S. Bureau of Mines

The Bureau awarded a grant of $24,000 to the Division for the acquisition of certain data regarding the occurrences of nickel and cobalt in California. Twenty-four such locations were examined in reconnaissance fashion, and a number of other locations which now are regarded as barren of such elements were also examined. The data thus derived will be transmitted to the Bureau early in the ensuing fiscal year.

The Bureau also awarded the Division two additional grants, each in the amount of $50,000, for similar data acquisition regarding chromite and manganese in California. Literature searches were begun on these projects that are scheduled for completion during fiscal year 1975-76.

The long-standing cooperative agreement between the Bureau and the Division concerning the collection of annual mineral production data by the Bureau on behalf of the State Geologist was continued.

U. S. Geological Survey

The U. S. Geological Survey provided funds for geological studies by the Division along the San Andreas fault in Los Angeles County, along the Elsinore fault in Riverside County, and along the Santa Monica-Hollywood-Raymond Hill fault in Los Angeles County. These studies are a part of the U. S. Geological Survey's earthquake hazard reduction program. Beginning in 1972-73 and continuing through 1974-75, the Division has been a participant in the program. During 1974-75, the grant amount was $100,000.

The Division continued its cooperative agreement with the U.S.G.S. by granting $2,500 for the continuance of active fault studies in the San Francisco Bay area.

OTHER ORGANIZATIONS

California Institute of Technology

Under a continuing agreement with the Seismological Laboratory, the Division provides funds toward the expense of performing services in connection with the recording and study of earthquakes in California. CIT provides prompt notification by telephone of the location of all earthquakes greater than Richter magnitude 4.5 in southern California.

OTHER COOPERATIVE ACTIVITIES

The Division continued to cooperate with Federal, State, county, and city agencies, universities and colleges, professional groups, private companies, and invididuals without formal contracts or matching funds, often on an individual basis, by exchanging information on the geology and the mineral resources of California. Many of the activities listed elsewhere in this Report have been materially assisted by such cooperation. Examples of some of these cooperative ventures are given here:

Access to libraries has been provided to Division staff by various colleges and universities. University of California campuses at Los Angeles, Riverside, and San Diego (Scripps Institution of Oceanography) and the California Polytechnic State University campus at San Luis Obispo also provide office space.

The long-standing cooperation with California Academy of Sciences continued with the Division's Senior Geological Scientist Charles W. Chesterman serving as the Academy's Honorary Curator of Minerals.

BUDGET SUMMARY

A decrease in the estimated total net expenditure ($1,817,614) for fiscal year 1974-75 as compared to the preceding year ($2,085,321) is due primarily to a tightened fiscal policy in compliance with the Administration policy. The greatest savings were in the areas of equipment and supply procurement and in contracted professional and consulting services. The Alquist-Priolo Special Studies Zones project and the Strong Motion Instrumentation program have stabilized and no longer have a significant effect on variations in program expenditure. The estimated total cost of operation of the Division, in the form of personal services, operating expenses, and equipment, amounted to $2,748,524 as compared to $2,986,562 for the preceding year. The decrease in total cost, which amounted to slightly less than 8%, reflects a combined effect of an increase in reimbursements and deliberate savings in operations, in the face of general inflationary increases.

Estimated Expenditures

Personal services		$1,682,111
Operating expenses		749,174
General expense	$ 91,527	
Printing	208.015	
Communications	42,714	
Travel, out-of-state	4,296	
Travel, in-state	62,252	
Motor vehicle operations	43,419	
Professional and consulting services	72,519	
Prorata costs	7,115	
Facilities operations	174,218	
Engineering reproduction	28,961	
Specialized training	1,872	
Electronic data processing	12,266	
Equipment		317,239
Total expenditures		$2,748,524
Estimated reimbursements		- 930,910
TOTAL ESTIMATED NET EXPENDITURE		$1,817,614

THE FUTURE

The Division has announced its desire to provide geological services to the State for all activities requiring the use or knowledge of geology. As the awareness grows that the Division has the capability to provide sound advice in matters relating to land-use and planning, it is anticipated that the demands for the Division's services will grow.

Opportunities for Federal funding to conduct sand and gravel investigations in the greater Los Angeles area during fiscal year 1975-76 are anticipated. The State may also have an opportunity during 1975-76 to participate with the U.S. Geological Survey in a cooperative agreement to secure aeromagnetic coverage of a part of the State. This would provide valuable data for mineral resources and fault investigations. It is also expected that the U.S. Geological Survey will award the Division an additional grant of $100,000 for continuation of geological investigations of faults in southern California.

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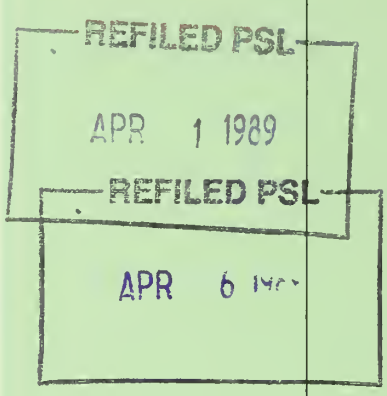

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